

Prevent culture-driven invasive species spread

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Biological invasions are known to threaten global biodiversity, economies, and human health (1, 2). Nevertheless, human activities have greatly contributed to biological invasion processes (3).

In some cases, the regional culture (e.g., religion, food, and/or tourism culture) plays a driving role in the spread of invasive species. For example, the alien plant *Cosmos bipinnatus* is often mistaken for Chinese Tibetan culture's rumored holy plant "Galsang flower" (4), which causes large-scale cultivation and establishment of natural populations of the former in and around the Tibetan Plateau, thereby threatening local plant populations. Each year, billions of animal and plant individuals are translocated and released into settings worldwide (partly driven by religious beliefs and/or unscientific environmentalism), resulting in massive inflow of alien species into wild populations (5). Moreover, ethnic and rural communities in some countries occasionally consume wild animals or/and plants (excluding protected species) (6, 7), and their harvesting, breeding, and trading behaviors inevitably promote further invasion of those edible invasive species (8).

Compared with the limited availability of human resources (scientists, government departments, or/and commonweal organizations) for controlling invasive species, the culture-driven public's contribution to the spread of invasive species can cause incalculable ecological consequences. Thus, we must implement measures to prevent invasive species from becoming part of public culture. First, distribution ranges of alien invasive species must be promptly monitored and risk assessments made. Then, the concept of invasive species and their harmful impacts can be

publicized through popular media (e.g., via social media, news websites, and TV ads) and governments can publicize on billboards areas within the ranges of invasive species. Additionally, scientists can help abbots, imams, and priests to learn and then disseminate relevant biological knowledge to religious believers, and tour guides can be trained to disseminate invasive species information to tourists. Finally, appropriate policies or laws must restrict blind use of invasive species.

We hope that scientists can focus on this issue before the upcoming International Day for Biological Diversity (May 22nd, 2019) and discuss relevant policies and initiatives on the fifteenth Conference of the Parties to the Convention on Biological Diversity in 2020 in Kunming, China (9).

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